

Prelab questions—nitration of phenylacetonitrile

1. Calculate the theoretical yield of the reaction. Show all work.
2. Give a mechanism for the formation of NO_2^+ , the nitrating species in this reaction.
3. The $-\text{CH}_2\text{CN}$ group has characteristics of an electron-donating group that donates electron density into the phenyl ring. Explain, using physical principles.
4. The $-\text{CH}_2\text{CN}$ group has characteristics of an electron-withdrawing group that withdraws electron density from the phenyl ring. Explain, using physical principles..
5. What are the accepted melting points of the potential ortho-, meta-, and para- products of this reaction? (Provide references.)